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CORRELATION OF MRI FINDINGS OF LUMBER SPONDYLOSIS WITH AGE AND GENDER, A CROSS-SECTIONAL STUDY

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Abstract

The majority of people worldwide report low back pain due to lumber spondylosis as their most prevalent complaint. Its great contrast in the soft tissues of the spine, along with its non-ionizing radiation nature, make it useful for identifying minute intervertebral disk alterations. The objectives of this study were to find the Correlation of MRI findings of lumbar spondylosis with age and gender. Over the course of three months, from May 2024 to July 2024 (ERC#134/2024), the research was conducted in the radiology department of the Government and Private Sector Hospitals and Diagnostic center in Punjab, Pakistan. Using magnetic resonance imaging, a total of 67 individuals with lumbar spondylosis were assessed in this cross-sectional and observational investigation. Several MRI characteristics of lumbar spondylosis were examined using the standardized MRI sequences for the lumbar spine. Patients between age 41-60 years had the highest frequency of lumbar spondylosis whereas, patients between age 61-80 years were second most affected population. Lumber spondylosis was more common among females who were 40 (57.1%) than males who were 27 and makes 38.6% of total population. LBP is 34.3%. Lumbar disc degenerative was 12.9%. Anterior osteophytes were present in 24(34.3%) patients. Hypertrophy of ligamentum flavum was 14.3%. Facet joint arthrosis was about in 14 patients (20%). Lumber lordosis curvature presents in 38(54.3%) patients. Intervertebral level L4/L5 was the most frequent site (34.3%). of disc degeneration and disc bulges. Second most affected site was L5/S1 level present in 14 (20%) individuals. Whereas, at L1/L2, L2/L3 and L3/L4 level were common among 2(2.9%), 4(5.7%) and 6(8.6%). Disc bulge was 75.7%. Disc tear and herniation was present only 5(7.1%) patients. Disc desiccation presents in 37(52.9%) patients. Hence concluded that there is association between MRI findings and age of patient but gender is not associated with these findings. These results underscore the importance of considering lumbar spondylosis and related degenerative changes as relevant issues in age 31-50 years' patients, mostly at the level of L4-L5, and also Osteophytes, Facet joint, Lumber lordosis curvature, and Hypertrophy of Ligamentum flavum.

Keywords: *Backache, Disc bulge, Lumbar spondylosis, MRI*

INTRODUCTION

Spondylosis is one of the spine problems that the world is dealing with; it is growing more and more critical as well as a major clinical issue (1). It is a degenerative disorder that worsens with age and affects the cervical and lumbar spine in particular. Lumbar spondylosis is a musculoskeletal condition that is frequently responsible for declining physical health in the elderly. Both symptomatic and asymptomatic lumbar spine degeneration are possible (2). A very common general medical condition, low back pain affects roughly two thirds, or 80% of people, at some point in their lives (3). It is the most well-known lumbar spondylosis clinical sign. Backache is a very common condition with a variety of potential causes. At some point in their life, 60 to 85 percent of people will have low back discomfort (4). Fortunately, most persons suffer only moderate, transient effects. 90% of them fade away in within six weeks. Chronic low back pain affects 35 to 40% of persons and is described as pain feelings that last more than three months. The minority with uncontrollable symptoms experiences severe negative effects on quality of life and financial implications (5).

Aging-related lumbar spondylosis (LS) is frequent and is thought to be connected to low back pain (LBP) and disability (6). Radiologically, osteophytes, endplate sclerosis, and disc-space narrowing are

indicative of LS. X -ray lumbar is the first imaging test used to diagnose and monitor the progression of spine problems. Since X-rays are quick, easy, and affordable, they are typically taken in the first instance (7). However, compared to CT or MR, X-rays have the drawback of having overlapping shadows of various thoraco-abdominal 3-dimensional structures (8). Disc height and disc degeneration identified from MR images are highly linked with lumbar radiography characteristics. Spinal X-rays have not been found to be a useful tool for determining the location of the spinal manipulation site (9). When compared to care without X-rays, studies on routine spinal X-rays for non-specific back or neck pain show no difference in treatment outcome. Because of this, the use of spinal X-rays is not well-supported by data confirmation for modality selection; instead, clinicians should choose the treatment modality based on the patient's clinical presentation (10).

Computed tomography (CT) is a dependable technique for analyzing the lumbar spine. It offers excellent osseous detail for evaluating scoliosis, trauma, non-displaced fractures, complex fractures, and patients who are pre- or post-operative (11). Ultrasound works best on tissues with a high collagen content, such as fascia, tendons, ligaments, and joint capsules. Degenerative disc disease has been studied using spinal ultrasonography to see if back pain results from fissuring or herniation of the gelatinous discs that separate the vertebrae. MRI is now regarded as the best, most accurate, and most trustworthy modality for lumbar spondylosis assessment and evaluation (12). This includes disc herniation, spinal compression, degenerative disk disease features, disk herniation, and the effects of instability in degenerative lumbar spondylosis. MRI imaging allows access to the intervertebral disc space and spinal column (13). The ability to coordinately evaluate components that cross the spinal column and the vertebral disk structure is another advantage of MRI. The diagnosis of lumbar spondylosis and dehydrated vertebral disks is made using variations in the signal intensity of the vertebral body end plate on MRI.

Magnetic resonance imaging (MRI) is helpful in detecting the many elements of degenerative disease of the spine and enables a comprehensive study of static and dynamic parameters connected to the condition (14). The main cause of lumbar spondylosis is disc degradation, which leads to instability of the lumbar spine. Subsequently, it might cause spinal canal stenosis, nerve root compression, disk displacement, and modic alterations. Lumbar spondylosis is common among middle aged individuals which make the majority of working population (15). Along with individuals it can cause a vulnerable impact on economic society. Therefore, there is a need to Analyze the underlying reason of persistent low back discomfort. MRI should be recommended to perform in these patients as it has better tissue enhancement ability. It is also needed to provide awareness in people to take measures that help in maintaining good quality of life.

The objectives of this study were to find the Correlation of MRI findings of lumbar spondylosis with age and gender

METHODOLOGY

A cross-sectional Descriptive study was conducted in department of Medical Imaging and Ultrasonography, School of Health Sciences at University of Management & Technology Lahore, Pakistan under ERC#134/2024 study approval. in which all 67 patients that were meeting the inclusion criteria of individuals between age group from 10-80 years' majority with low backache pain who were referred for LS spine MRI was selected from the radiology departments of different hospital and diagnostic centers of Punjab Pakistan, during the period of May 2024 to July 2024. The Lumbo-sacral MRI was performed. All patients were examined 0.35, 1.5 and 3 Tesla's Close MRI machine using MRI sequences of Sagittal T2, Sagittal T1, Axial T2 and Axial T1 weighted images. A Performa was designed on which demographic findings such as age and gender and MRI findings were noted. Present symptom of the patients like backache was also taken into account.

The inclusion criteria of our study were both Genders male and female with age range between 10 to 80 years with lumber spondylosis. The exclusive criteria of our study were patients experiencing recent trauma., cancer, infections, or spinal injuries, a pregnant woman, Cervical spine involvement. Patients who had undergone surgery in the past were not accepted. Collected data was transferred to SPSS-25 computer

software and was analyzed accordingly. The continuous variable was stated as Mean + SD and categorical variables in the forms of frequency. For the analysis of data, a data collection sheet has been made in which all information collected from patient including age, gender and symptom of low back pain along with their MRI outcomes which involved different degenerative patterns and location of lumbar spondylosis, Disc Bulge, Disc Herniation or Tear, Facet Joint were noted. Collected data was transferred to SPSS-25 computer software and was analyzed accordingly. The Quantitative variables were stated as Mean + SD and categorical variables in the forms of frequency & %ages.

RESULTS

Total 67 Patients were included in this study in which 34 (50.7%) females and males were 33 (49.3%). Patients between age 31-50 years had the highest frequency of lumbar spondylosis whereas, patients between age 51-70 years were second most affected population. Demographics and Study Characteristics are shown in comprehensive Table I.

Table I. Demographics and study characteristics

Frequency of Gender		
Gender	**Frequency**	**Percent**
Male	33	49.3%
Female	34	50.7%
Total	57	100%
Frequency of Age		
Age	Frequency	Percent
10-30 y	7	10.4%
31-50 y	35	52.2%
51-70 y	21	31.3%
71-80 y	4	6%
Total	67	100%
Frequency of Backache		
Backache	Frequency	Percent
No	43	64.2%
Yes	24	35.8%
Total	67	100%
Frequency of lumber disc degenerative changes		
Lumber disc degenerative changes	Frequency	Percent
No	58	86.6%
Yes	9	13.4%
Total	67	100%
Frequency of disease distribution		
MRI FINDINGS	Frequency	Percent
Disc Bulge	53	79.1%
Disc Herniation	5	7.5%
Disc Desiccation	37	55.2%
Disc Degenerative changes	9	13.4%
Formation of osteophytes	24	35.8%
Thickening of Ligamentum flavum	10	14.9%
Lumbar lordosis curvature	38	56.7%
Facet joint arthrosis	14	20.9%
Frequency of osteophytes		
Osteophytes	Frequency	Percent
No	43	64.2%
Yes	24	35.8%
Total	67	100
Frequency of Hypertrophy of Ligamentum Flavum		
Hypertrophy of ligamentum flavum	Frequency	Percent
No	57	85.1%
Yes	10	14.9%
Total	67	100%
Frequency of Disc Bulge		
Disc bulge	Frequency	Percent
Absent	14	20.9%

Present	53	79.1%
Total	57	100%
	Frequency of Lumber Lordosis Curvature	
Lumbar lordosis curvature	Frequency	Percent
No	29	43.3%
Yes	38	56.7%
Total	67	100%
	Frequency of location of Lumbar spondylosis	
Location of lumbar spondylosis	Frequency	Percent
No disc bulge	17	25.4%
L1-L2	2	3%
L2-L3	4	6%
L3-L4	6	9%
L4-L5	24	35.8%
L5-S1	14	20.9%
Total	67	100%
	Disc Tear or Herniation	
Disc tear or herniation	Frequency	Percent
Absent	62	92.5%
Present	5	7.5%
Total	67	100%
	Frequency of Disc Desiccation	
Disc desiccation	Frequency	Percent
Absent	30	44.8%
Present	37	55.2%
Total	67	100%
	Frequency of Facet joint	
Facet joint	Frequency	Percent
No	53	79.1%
Yes	14	20.9%
Total	67	100%

It was demonstrated the presence of lower backache. Out of 67 patients LBP is present in 24 and its percentage was 35.8 whereas, it is not present in 43 patients and its percentage is 64.2%. Lumbar disc degenerative was frequent in 9 patients with percentage of 13.4% and it is absent in 58 patients whose percentage is 86.6%. MRI finding named hypertrophy of ligamentum flavum was present in 10 patients and making 14.9% and it was not present in 57 (85.1%). Facet joint arthrosis was seen in about in 14 patients (20.9%) and was absent in 53 patients that makes percentage of about 79.1%. lumber lordosis curvature was present in 38(56.7%) patients and absent in 29(43.3%) patients. location of lumbar spondylosis L4/L5 was the most frequent site of disc degeneration and disc bulges in 24 patients making (35.8%). Second most affected site was L5/S1 level present in 14 (20.9%) individuals. Whereas, at L1/L2, L2/L3 and L3/L4 level were common among 2(3%), 4(6%) and 6(9%). The disc bulge was present in 53 patients, its percentage is 79.1% and absent in 14(20.9%) patients. The disc tear and herniation were present in only 5(7.5%) patients and absent in 62(92.5%) patients. The disc desiccation presents in 37(55.2%) patients and absent in 30(44.8%) patients.

DISCUSSION

The most prevalent medical condition these days is Lumber Spondylosis. There are several possible etiologies for this troubling situation (16). Lower back discomfort typically has non-specific symptoms, but it can also result in significant sickness and disability. Spondylosis prevalence in lumber is increasing as life expectancy rises (17). The most common cause of lower back pain in the world is lumbar spondylosis. In the modern era, magnetic resonance imaging (MRI) is a wonderful non-invasive imaging technique for assessing underlying abnormalities in the spine (18). The goal of the current study was to assess the relationship between lumber spondylosis and MRI age and gender. Lumber spondylosis is caused by a variety of lumbar spine diseases. The radiology department received 67 patients with lumber spine illness in total for lumbosacral spine MRI scans. The findings of previous studies are similar with our research

findings. But we don't just add up All findings of Lumber Spondylosis, also correlate these with Age and Gender. In previous research, a researcher also includes patients with Traumatic and Congenital lesions (19). But we don't add any traumatic, congenital diseased and infenction of LS patients. In previous research they only find the vertiberal level which most commonly affected, But we correlate the vertibral location with Age (20). In previous research, about dehydrated discs, Herniation, disc degeneration and the site mostly involve, but we also add up Osteophyte, Ligamentum Flavum Hypertrophy, Disc bulge and facet join (21).

In research involving 40 patients, a group of researchers found that 42% of the discs were degenerated, with dehydrated discs being most common at the L4-L5 and L5-S1 levels (22). Nearly identical findings that showed the prevalence of various disc degeneration patterns were excluded from the current study. A researcher discovered aberrant imaging results in the spines of individuals without symptoms, with a prevalence ranging from 37% in people 20 years of age to 96% in people 80 years of age (23). Disk degeneration, disk herniation, disk height loss, and facet arthritis are all common aspects of aging naturally. A group of colleagues examined the MRIs of 1043 individuals, ranging in age from 18 to 55. According to this study, lumbar disc degeneration was found in 40% of people under 30 and was highly prevalent in those over 90 years of age. L4/L5 and L5/S1 are the most often affected levels (24). Although there is a significant difference in the findings from the current investigation, it is possible that this is due to the limited patient number. This research was almost identical in its attempt to assess incidence and various findings on MRI.

In the analysis, degenerative disease of the lumbar spine on MRI was examined and discovered that the most common condition of the lumbar spine was degenerative disease (25). MRI is the gold standard for determining the cause of low back pain. The abnormal results of lumbar disc degeneration, such as disc bulging, annular fissure, and protrusion, were demonstrated using MRIs of young, asymptomatic Koreans. L4/L5 and L5/S1 were shown to be the frequent lumbar vertebral levels with the highest prevalence of degeneration (26). The current study highlights the remarkable sensitivity of magnetic resonance imaging in assessing degenerative diseases of the lumbar region. Our study evaluated facetal arthropathy, modic alterations, and degeneration of the lumbar spine disk as features of degeneration.

According to a previous study, lumbar intervertebral disk degeneration was the most frequently observed condition in 91.2% of patients with low back pain. When researching the disorders associated with rheumatism, it was founded that degenerative arthritis was the most prevalent cause of lower back pain, with a prevalence of 3.95% and 7.35%, respectively, and lumbar spondylosis, with a prevalence of 0.7% (27). Additionally, it was determined that diabetes is a risk factor for people who have low back pain and osteoarthritis (28). In Malaysia, a researcher recorded 19.4%, protrusion and extrusion 50%, and disk bulging 40.4%. In one study, there were more reports of extrusion and protrusion and fewer disc bulges. Research found that 92% of discs bulge, 28% extrude, and 74% protrude. In another investigation, more bulges, extrusions, and protrusions were noted (29,30).

The area of the body that is under the most mechanical and general stress is the lumbar spine. The lumbar disk is usually prone to erosion. The majority of subjects (60%) had disk bulges, and 51.2% frequently had lesions at the L4-L5 level, while 23.8% had lesions at the L5-S1 level. These results provide support for one area of certainty. Individuals with lumbar spondylosis are more likely to experience serious adverse effects such as segmental instability, neural compression, nerve irritation, and stenosis. This study found that disc herniation and disc bulge frequently resulted in compression and impingement of 40% of nerve roots and 47.6% of cauda equina nerves. On the other hand, Mboka et al. assessed spinal nerve root 77% compression.

This study's foundation was cross-sectional data, which offers important insights into the field. This study investigated the association between age and gender, as well as cervical spondylosis, using MRI imaging. Our study's findings show a significant relationship between cervical spondylosis age and severity. Several aspects of the spine that the current investigation has found may have a major impact on

the diagnostic strategy chosen to evaluate spine disorders. This research will also contribute to our understanding of the normal aging phenomenon, which will assist people further improve their quality of life. This work will help assess the degenerative process in the spine and the associated risk factors for future spine research.

CONCLUSION

Hence concluded that there is association between MRI findings and age of patient but gender is not associated with these findings. These results underscore the importance of considering lumbar spondylosis and related degenerative changes as relevant issues in patients at age of 31-50 years. The findings also suggest that gender may play a role in the prevalence of lumbar spine diseases, which could inform future research and clinical practice. Limitations: Limited resources is the main limitation of this study. The study's findings may be limited by the sample size and the exclusion of patients with certain conditions, suggesting a need for further research with a more diverse population.

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